Patent Claims

1. A turbine shaft (2, 8) which is oriented in an axial direction (19),
having a first flow region (5, 13) and a second flow region (6, 14), which adjoins the first flow region (5, 13) in the axial direction (19),
the turbine shaft (2, 8) comprising a first material in the first flow region (5, 13) and
comprising a second material in the second flow region (6, 14), characterized in that
the first material comprises a heat-resistant steel, and
the second material comprises a steel which is tough at low temperatures.

2. The turbine shaft (2, 8) as claimed in claim 1, characterized in that the first material comprises a 2 CrMoNiWV steel and the second material comprises a 3.5 NiCrMoV steel.

3. The turbine shaft (2, 8) as claimed in claim 1, characterized in that the first material includes
0.20 - 0.24% by weight of C, ≤ 0.20% by weight of Si, 0.60 - 0.80% by weight of Mn, ≤ 0.010% by weight of P, ≤ 0.007% by weight of S, 2.05 - 2.20% by weight of Cr, 0.80 - 0.90% by weight of Mo, 0.70 - 0.80% by weight of Ni, 0.25 - 0.35% by weight of V and 0.60 - 0.70% by weight of W
and the second material includes
0.22 - 0.32% by weight of C, ≤ 0.15% by weight of Si, 0.15 to 0.40% by weight of Mn, ≤ 0.010% by weight of P, ≤ 0.007% by weight of S, 1.20 - 1.80% by weight of Cr, 0.25 - 0.45% by weight of Mo, 3.40 - 4.00% by weight of Ni, 0.05 - 0.15% by weight of V.

4. The turbine shaft (2, 8) as claimed in one of claims 1 to 3, characterized in that a structural weld seam (4) is arranged between the first material and the second material.

5. The turbine shaft (2, 8) as claimed in one of the preceding claims, characterized in that the structural weld seam (4) includes a weld filler.

6. The turbine shaft (2, 8) as claimed in claim 5, characterized in that the weld filler includes 2% by weight of nickel.

7. A process for producing a turbine shaft (2, 8) which comprises two materials and is oriented in an axial direction (19), characterized in that the first and second materials are directly joined to one another by means of a structural weld (4).

8. The process as claimed in claim 7, characterized in that a 2 CrMoNiWV steel is used for the first material and a 3.5 NiCrMoV steel is used for the second material.

9. The process as claimed in claim 7, characterized in that 0.20 - 0.24% by weight of C, ≤ 0.20% by weight of Si, 0.60 - 0.80% by weight of Mn, ≤ 0.010% by weight of P, ≤ 0.007% by weight of S, 2.05 - 2.20% by weight of Cr, 0.80 - 0.90% by weight of Mo, 0.70 - 0.80% by weight of Ni, 0.25 - 0.35% by weight of V and 0.60 - 0.70% by weight of W is used for the first material, and
0.22 - 0.32% by weight of C, ≤ 0.15% by weight of Si, 0.15 - 0.40% by weight of Mn, ≤ 0.010% by weight of P, ≤ 0.007% by weight of S, 1.20 - 1.80% by weight of Cr, 0.25 - 0.45% by weight of Mo, 3.40 - 4.00% by weight of Ni, 0.05 - 0.15% by weight of V is used for the second material.

10. The process as claimed in one of claims 7 to 9, characterized in that a weld filler is fed to the structural weld (4).

11. The process as claimed in claim 10, characterized in that the weld filler used is a material which includes 2% by weight of nickel.

12. The use of the turbine shaft (4) as described in one of claims 1 to 11 in a steam turbine.